SECTION l5l80

PIPE AND EQUIPMENT INSULATION

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included: Provide and apply insulation to all non-buried interior piping in accordance with Table 1, heating system pipeline components, boiler breaching and emergency generator exhaust pipe and muffler.

B. Related Work Specified Elsewhere: "Plumbing - General", "HVAC General", and "Emergency Generator Exhaust Piping" are specified in this Division.

1.2 QUALITY ASSURANCE

A. Standards:
   1. Fiberglass pipe insulation shall conform to ASTM C547.
   2. All-service vapor retarder jacket shall conform to ASTM C1136.
   3. Calcium silicate block and pipe thermal insulation shall conform to ASTM C533.

B. Have all insulation work performed by skilled insulation workmen regularly employed in the trade.

C. Fire Hazard Rating: Except for materials listed below, all insulation materials, adhesives, coatings and other accessories shall have a UL fire hazard rating not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed. Exceptions are:
   1. Factory pre-molded one-piece PVC fitting and valve covers and pipe jacketing.
   2. Asphaltic mastic.

D. Acceptable Manufacturers:
   1. Fiberglass:
      a. Manville
      b. Owens-Corning
      c. Certainteed
      d. Knauf
   2. Asbestos free calcium silicate:
      a. Manville
      b. Owens-Corning
      c. Keene

PART 2 - PRODUCTS

2.1 MATERIALS

A. Fiberglass Pipe Insulation:
   1. Mineral fiber thermal insulation.
   2. All service vapor retarder jacket.
   3. Required for use on all pipes as listed in Table 1.

4. All cold piping shall be sealed to prevent condensation.
5. Thickness of insulation shall conform to Table 1.

B. Boiler Breaching.
1. Asbestos-free calcium silicate.
2. Sectional pipe or block sections as required.
3. Thickness: 2 inches.
4. Covering: 16 oz. fiberglass lagging cloth.
a. Point calcium silicate with cement.
b. Prime surface with lagging sealer adhesive.
c. Embed the fiberglass lagging cloth in the sealer adhesive.
d. Top coat the lag cloth with sealer.

C. Fittings and Valves:
1. Pre-molded PVC covers with fiberglass fill on fiberglass insulation systems.
2. Pre-molded, or fabricated mitered sections on calcium silicate systems.
3. Do not insulate unions and flanges.

D. Staples: Outward clinching type, type 304 or 3l6 stainless steel.

E. Adhesives:
1. Fiberglass: Non-flammable vapor barrier adhesive as manufactured by Benjamin Foster or Childers.

2.2 APPLICATION THICKNESS TABLES

Table 1
Minimum Pipe Insulation*

		Insulation Thickness in inches for Pipe Sizes					
Piping System Type	Fluid Temp Range, °F	Runouts Up to 2"	1" & Less	1-1/4 to 2"	2-1/2 to 4"	5 & 6"	8" and Larger
Domestic Water Systems							
Cold Water	--	--	½	1	1	1	1
Hot Water	--	--	1	1½	1½	2	2
Plant Water System	--	--	½	1	1	1	1
Heat Systems							
Steam/Hot Water							
High Pressure/Temp.	Above 350	1½	2½	2½	3	3½	3½
Med. Pressure/Temp.	251 - 350	1½	2	2½	2½	3½	3½
Low Pressure/Temp.	201 - 250	1	1½	1½	2	2	3½
Low Temperature	120 - 200	½	1½	1½	1½	1½	1½

		Insulation Thickness in inches for Pipe Sizes					
Piping System Type	Fluid Temp Range, °F	Runouts Up to 2"	1" & Less	1-1/4 to 2"	2-1/2 to 4"	5 & 6"	8" and Larger
Steam Condensate (for feed water)	Any	1	1	1	1½	1½	2
Chilled Water, Refrigerant or Brine	40 - 55	½	½	¾	1	1	1
	Below 40	1	1	1½	1½	1½	1½
Horizontal Roof Leaders and Roof Drains Bodies	--	--	½	1	1	1	1

* Based on minimum thermal resistance (R) of 4.0 per inch of thickness on a flat surface at a mean temperature of 75°F.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Apply insulation only after all pipes have been tested and approved.
B. Clean and dry all surfaces to which insulation is to be applied.
C. Neatly finish the ends of insulation on exposed piping at valves, flanges, etc., with cover strips.
D. Insulation at sleeves:
    l. Insulation shall be continuous through all sleeves except where gas-tight seal is indicated.
    2. Provide aluminum cover on insulation where caulking is required.
    3. Delete insulation at walls requiring a gas-tight seal.
E. Insulation at Hangers:
    l. Insulation shall be continuous at hangers.
    2. Provide protection saddles at pipe hangers where required to prevent compression or distortion of insulation in accordance with insulation manufacturer's requirements.
F. Fiberglass factory applied insulation jacket:
    l. Seal all laps, joint strips, exposed staples, exposed ends with vapor barrier adhesive.
    2. Install only when temperature is between 40 degrees and l20 degrees F.
    3. Secure with staples where required for additional strength and to prevent fishmouths.

3.2 CLEANING

A. Clean all insulation of accumulated paint, concrete, mortar, etc.
B. Do not damage insulation during cleaning.

END OF SECTION